

# Interior of the Sun

## The Sun

- The Sun is a sphere, composed almost entirely of the elements hydrogen and helium.
- The Sun is not solid, nor is it a typical gas.
  - It does not have a defined outer boundary.
  - It does have a definite internal structure with identifiable layers.
  - Most atoms in the Sun exist as **plasma**.
- Fourth state of matter made up of superheated gas with a positive electrical charge.

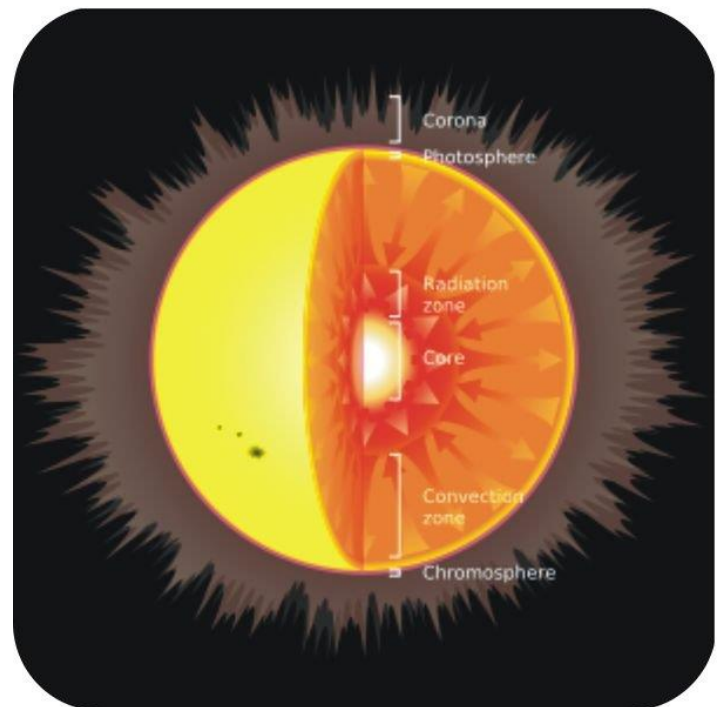
### Study Tip

How would scientists use cameras to observe different layers of the Sun? Hint: Different temperatures are associated with different wavelengths on the electromagnetic spectrum!

## Internal Structure

From inward to outward, the layers of the Sun are:

- **Central Core**
  - Plasma with a temperature is around 27 million °C.
  - At high temperatures hydrogen goes through **nuclear** fusion, which forms helium.
  - This energy moves outward, towards outer layers of the Sun.
- **Radiative Zone**
  - Temperature of about 7 million °C.
  - Energy from core travels extremely slowly through here.
    - **Photons** (particles of light) travel only a little before they hit another particle.
    - The photon is absorbed and then released again.
- **Convection Zone**
  - Hot material from near the radiative zone rises, cools at the Sun's surface, and plunges back downward to the radiative zone.
  - Convective movement helps to create solar flares and sunspots.



## The Outer Layers

There are no solid layers to any part of the Sun's atmosphere; these boundaries are fuzzy and indistinct.

- **Photosphere**
  - The photosphere is relatively cool (6,700 °C).
  - Visible surface of the Sun.
  - Region that emits sunlight.
  - The photosphere has several different oranges, yellow and reds.
- **Chromosphere**
  - Temperatures range from about 4,000°C to about 10,000°C.
  - Jets of gas speed up 72,000 km per hour & are 10,000 km high.
  - Thin zone (2,000 km thick).
  - Glows red as it is heated by energy from the photosphere.
- **Corona**
  - Temperature of 2-5million °C (much hotter than photosphere).
  - Outermost plasma layer.
  - It is the Sun's halo or "crown."

## Concept Check

- What is the Sun made out of?
- What are the different zones and where are they located?
- What kinds of fusion occur in the central core?
- Describe the behavior of photons in the radiative zone.
- What does the photosphere emit?